

BY THE U.S. GENERAL ACCOUNTING OFFICE

*Released*

Report To The Honorable Theodore S. Weiss  
House Of Representatives

## Observations On Navy Nuclear Weapon Safeguards And Nuclear Weapon Accident Emergency Planning

In March 1985, the Secretary of the Navy selected Stapleton-Fort Wadsworth, Staten Island, New York, as the homeport site for a Surface Action Group in the northeastern United States. The Surface Action Group will be capable of carrying nuclear-armed Tomahawk land attack cruise missiles. While it is Navy policy that the actual presence of nuclear weapons on ships at any particular time is neither confirmed nor denied, public health and environmental safety concerns have developed based on the assumption that nuclear weapons will be aboard the ships at Stapleton-Fort Wadsworth.

This report discusses Tomahawk land attack missile nuclear safeguards, which, if implemented properly, should reduce the danger of a nuclear weapon accident to a minimum. Information on the status of emergency preparedness planning and on nuclear weapon accidents and incidents, hazards, exercises, and responsibilities for nuclear weapon accident response is also presented.





UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND  
INTERNATIONAL AFFAIRS DIVISION

B-216376

The Honorable Theodore S. Weiss  
House of Representatives

Dear Mr. Weiss:

In your January 17, 1984 letter, you asked us to review Navy plans to homeport a Surface Action Group with nuclear armed cruise missiles at Staten Island, New York. You were concerned about cruise missile safety/security and about measures to safeguard the public against a nuclear weapon accident at the homeport site. In a classified briefing on June 7, 1984, we discussed nuclear armed cruise missile safeguards with you. As agreed with your office, this letter presents the unclassified information obtained during our review. In this connection, we remind any reader of this report that certain information (site specific information on nuclear weapon accident roles and responsibilities) has been omitted because of its classified nature.

The Surface Action Group will consist of one Iowa class battleship, one Ticonderoga class cruiser, two guided missile destroyers (one Kidd class and one Farragut class), one Spruance class destroyer, and two Knox class Naval Reserve Force frigates. One class of these ships is capable of carrying nuclear armed Tomahawk land attack missiles.

It is Navy policy that the actual presence of nuclear weapons on Navy ships at any particular time be neither publicly confirmed nor denied. However, in accident situations, Navy instructions require notification of public authorities confirming the presence of nuclear weapons if the public is, or may be, in danger of radiation exposure or any other danger posed by the nuclear weapons.

Our work focused primarily on nuclear armed cruise missile safeguards. We did not evaluate the need for homeporting a Surface Action Group at Staten Island. Our observations on Tomahawk Land Attack Missile-Nuclear weapon system safety/security; the Stapleton-Fort Wadsworth decision and funding; the status of emergency preparedness planning; environmental impact

statement matters; nuclear weapon accidents; and accident responsibilities, exercises, and hazards are briefly discussed below and are presented in greater detail in appendix I.

#### NORTHEASTERN HOMEPORT SITE

The Navy requested and received homeporting proposals from (1) the Port Authority of New York and New Jersey, (2) the Boston Economic Development and Industrial Corporation, and (3) the Rhode Island Department of Economic Development. On July 29, 1983, after a Navy technical analysis of the proposals, the Secretary of the Navy announced the Stapleton-Fort Wadsworth site on Staten Island as the "preferred homeport" alternative.

#### Stapleton-Fort Wadsworth decision and funding

On March 14, 1985, the Navy announced its decision to construct, homeport, and operate the Surface Action Group at Stapleton-Fort Wadsworth. We have not yet completed our examination of the information used in the homeporting decision. We are continuing our examination of available information and will report the results to you as soon as possible.

Navy funding proposed for Stapleton-Fort Wadsworth totaled \$291 million as of February 12, 1985. Approximately \$7 million was included in the President's fiscal year 1986 budget for land acquisition and initial site preparation. The Navy is working toward an initial operating capability in September 1988; however, according to the Navy, if fiscal year 1986 funding is not increased above the requested \$7 million, initial operating capability will slip to September 1989.

#### Status of emergency preparedness planning

Since the decision to homeport the Surface Action Group at Stapleton-Fort Wadsworth, Naval Station New York representatives have met with Staten Island officials to initiate emergency preparedness planning discussions. A Disaster Preparedness Program is to be implemented and emergency plans are to be developed to accommodate the Surface Action Group homeporting at Stapleton-Fort Wadsworth in 1988 or 1989. Given the developing status of these plans, we found it is too early to evaluate their adequacy. (See app. I, p. 1.)

#### ENVIRONMENTAL IMPACT STATEMENT

On October 19, 1984, the Navy released for public comment a draft environmental impact statement that addresses actions associated with the development of the preferred homeport site.

Navy regulations require that both unclassified and classified actions be addressed by an environmental impact statement and that, when feasible, this statement be organized in such a manner that classified actions are included as annexes that can be used internally by department decisionmakers and that the unclassified portion can be released to the public.

The Surface Action Group will be nuclear weapons capable. If nuclear weapons are proposed to be present aboard the Surface Action Group in or near port, the law and Navy instructions contemplate that such classified environmental impact documents will be prepared for use in the decisionmaking process concerning the homeporting action.

Legal considerations aside, public health and environmental safety concerns about possible hazards related to the presence of nuclear weapons have developed in the New York City area. The Navy's unclassified draft environmental impact statement did not include information on nuclear weapon accident effects. However, many written comments received by the Navy on the draft environmental impact statement concern nuclear weapon accidents. Our examination of these comments indicated that the public is not well informed about nuclear weapon safety, accident hazards, and environmental effects.

The Navy filed the final environmental impact statement with the Environmental Protection Agency in February 1985. The final environmental impact statement addressed the homeporting operational effects on a range of environmental and socioeconomic issues, including navigation safety and public concern with ship accidents and mishaps at the New York harbor. The Navy appended to its final environmental impact statement, references to nuclear topics that are available to the public independent of the environmental impact statement. With respect to specific discussion on these issues regarding nuclear weapons, the Navy policy to neither confirm nor deny the presence of these weapons aboard ships forbids such discussion in the interest of national security (see app. I, p. 3.)

NUCLEAR WEAPON SYSTEMS SAFETY--  
TOMAHAWK LAND ATTACK MISSILE

The surface-launched Tomahawk Land Attack Missile-Nuclear weapon system includes a cruise missile with a nuclear warhead, a deck mounted armored box launcher, a weapon control system, and a mission planning system. Because of their political and military importance, their destructive power, and the potential consequences of an accident or unauthorized act, Department of Defense and Navy guidance require that nuclear weapon systems be protected against the risks and threats inherent in their environment.

The search for nuclear weapon system safety begins early in development and continues throughout the life cycle of the system. In the case of Tomahawk, an initial safety study, completed in 1982, evaluated the proposed operational concept and design safety features. In 1984, the Navy's preoperational safety study for the surface-launched Tomahawk Land Attack Missile-Nuclear system included preparation of system safety rules and a determination that the system met Defense and Navy safety standards.

These safety study reports and other classified documents showed the Tomahawk nuclear warhead to be one of the safest, most modern designs in the nuclear weapon inventory. Safety features and procedural safeguards intended to bring the Tomahawk Land Attack Missile-Nuclear system into compliance with Defense safety standards, if implemented properly, should reduce the danger of a nuclear weapon accident to a minimum. (See app. I, p. 5.)

#### NUCLEAR WEAPON ACCIDENTS AND INCIDENTS

A nuclear weapon accident is an unexpected event involving nuclear weapons or radiological nuclear weapon components that results in:

- Accidental or unauthorized launching, firing, or use by U.S. forces or U.S. supported allied forces of a nuclear capable weapons system that could create the risk of an outbreak of war.
- Nuclear detonation.
- Nonnuclear detonation or burning of a nuclear or radiological nuclear weapon component.
- Radioactive contamination.
- Seizure, theft, loss, or destruction of a nuclear weapon or a radiological nuclear weapon component, including jettisoning.
- A public hazard, actual or implied.

Our review of Defense documents showed that despite severe stresses imposed on nuclear weapons involved in accidents, there never has been an inadvertent U.S. nuclear detonation. However, during the period 1950-68, nuclear weapon accidents occurred which resulted in detonation of the high explosive components of the weapon and in radiological problems. Most of the weapon systems involved in these accidents are no longer in the active inventory.

Navy ships have operated with nuclear weapons capability for nearly 30 years. Our review of Defense records showed that the Navy has had three nuclear weapon accidents. None of these accidents resulted in severe damage to the weapon or release of radioactive material. Further, these accidents did not occur on ships in port or where civilian population or property was endangered.

A nuclear weapon incident is an unexpected event involving nuclear weapons, test and training weapons, bomb dummy units, nuclear weapon facilities, components, or associated test and handling equipment that does not fall in the nuclear weapon accident categories. The Navy reported 563 nuclear weapon incidents from January 1965 through December 1983. Of the 563 nuclear weapon incidents reported, 330 involved no weapon, or the weapon or component involved was nonnuclear.

The Navy reported 233 incidents involving nuclear weapons from 1965 through 1983. Most of these incidents occurred at sea and at Navy shore facilities. Sixty-two incidents involved nuclear weapons aboard surface ships in port. Because nuclear components were not damaged, none of these incidents posed a threat to the public. Many of the incidents in port were caused by sprinkler malfunctions which resulted in flooding of the weapons magazine. None of the nuclear weapon incidents were caused by ship collisions. (See app. I, p. 6.)

#### NUCLEAR WEAPON ACCIDENT HAZARDS

The Department of Energy designs nuclear weapons to ensure weapon integrity even in the event of an accident. In this regard, a specific sequence of positive actions is required to ready a weapon for nuclear detonation. While it is not possible to predict the exact effect of an accident, Department of Energy studies indicate that the possibility of an accidental nuclear explosion while transporting or storing nuclear weapons is so remote as to be virtually nonexistent.

In nuclear weapon accident situations, such as fires, there is a probable hazard commensurate with conventional weapons and material. The two components of a nuclear weapon that constitute the most probable hazard are the (1) high explosives and (2) plutonium.

According to an Energy/Defense document, high explosives comprise the major hazard associated with accidents involving nuclear weapons. The Tomahawk nuclear warhead contains a new type called "insensitive" high explosive, which is designed to resist detonation from energy sources other than the source intended to fire the weapon.

Plutonium is a highly toxic, radioactive material. However, if plutonium remains outside the human body it is not a hazard, according to Energy and Defense documents. Plutonium emits alpha radiation that cannot penetrate the skin.

In an accident situation, plutonium may be hazardous if dispersed as small particles upon weapon impact, upon detonation of the high explosive, or if dispersed as fumes if a fire occurs. Energy and Defense analyses indicate that inhalation of fine plutonium particles during the passage of the cloud resulting from a detonation of the high explosive or fire is the main potential source of plutonium intake into the body. Department of Energy documents show that the plutonium hazard has been reduced in recent years because modern nuclear warheads, such as the Tomahawk, are designed to prevent the release of plutonium under accident conditions. (See app. I, p. 8.)

#### NUCLEAR WEAPON ACCIDENT RESPONSIBILITIES

In the event of a nuclear weapon accident, Navy and federal objectives are to render the weapon(s) safe from nuclear and conventional explosion, recover all classified materials, and assist in restoring the affected area to normal use. The Departments of Defense and Energy and the Federal Emergency Management Agency are the primary federal agencies responsible for responding to a nuclear weapon accident and assisting the state and the local community if they are affected. (See app. I, p. 10 for the responsibilities and roles of each of these federal agencies and the state and local governments.) Because of national security reasons, site-specific information on nuclear weapon accident roles and responsibilities is not discussed.

#### NUCLEAR WEAPON ACCIDENT EXERCISES

National nuclear weapon accident response capability exercises were conducted in 1979, 1981, and 1983. The 1981 and 1983 exercises were joint Department of Defense, Department of Energy, and Federal Emergency Management Agency exercises that also involved state emergency response organizations. The 1983 exercise was a learning experience of great benefit to the nuclear weapon accident response community. Comparison of the 1983 exercise deficiencies and lessons learned with those of earlier exercises illustrated major improvements and understanding of the problems inherent in a nuclear weapon accident. (See app. I, p. 12.)

#### AGENCY COMMENTS

We obtained Department of Defense comments on drafts of this report. (See apps. II and III.) Defense generally

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concluded with our findings and provided information to update the report. We also discussed this report with Department of Energy representatives who agreed with the information in the report and suggested various additions. We incorporated most additions suggested by the department representatives.

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As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from its issue date. At that time, we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,



Frank C. Conahan  
Director

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### ABBREVIATIONS

DOD	Department of Defense
DOE	Department of Energy
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
NEPA	National Environmental Policy Act of 1969
SAG	Surface Action Group
TLAM-N	Tomahawk Land Attack Missile-Nuclear

OBSERVATIONS ON NAVY NUCLEAR WEAPON SAFEGUARDS  
AND NUCLEAR WEAPON ACCIDENT EMERGENCY PLANNING

NORTHEASTERN HOMEPORT SITE

In December 1982 the Chief of Naval Operations requested that investigative studies be initiated to determine the feasibility of homeporting a Surface Action Group (SAG) in the northeastern United States. According to the Navy, a SAG will consist of one Iowa class battleship, one Ticonderoga class cruiser, two guided missile destroyers (one Kidd class and one Farragut class), one Spruance class destroyer, and two Knox class Naval Reserve Force frigates.

The Navy requested and received SAG homeporting proposals from (1) the Port Authority of New York and New Jersey, (2) the Boston Economic Development and Industrial Corporation, and (3) the Rhode Island Department of Economic Development. After a Navy technical analysis of the proposals, the Secretary of the Navy, on July 29, 1983, announced the Stapleton-Fort Wadsworth site on Staten Island as the "preferred homeport" alternative for the SAG.

Stapleton-Fort Wadsworth  
decision and funding

On March 14, 1985, the Navy announced its decision to construct, homeport, and operate the SAG at Stapleton-Fort Wadsworth. We have not yet completed our examination of the information used in the Navy's homeporting decision. We are continuing our examination of available information and plan to report the results as soon as possible.

Navy funding proposed for Stapleton-Fort Wadsworth totaled \$291 million as of February 12, 1985. Approximately \$7 million was included in the President's fiscal year 1986 budget for land acquisition and initial site preparation. The Navy is working toward an initial operating capability in September 1988; however, according to the Navy, if fiscal year 1986 funding is not increased above the \$7 million requested, the Navy's initial operating capability will slip to September 1989.

Status of emergency  
preparedness planning

Since the decision to homeport the SAG at Stapleton-Fort Wadsworth, Naval Station New York representatives have met with Staten Island officials to initiate emergency preparedness

planning discussions. A Disaster Preparedness Program is to be implemented and emergency plans are to be developed to accommodate the SAG homeporting at Stapleton-Fort Wadsworth in 1988 or 1989. Given the developing status of these plans, it is too early to evaluate their adequacy.

Each SAG vessel, also, will have emergency response procedures for accident situations which might reasonably be expected to occur while entering or leaving port. These procedures include informing public authorities of accidents. Navy procedures also require the presence of nuclear weapons to be confirmed when authorities are notified of accidents where the public is or may be in danger of radiation exposure or any other danger posed by nuclear weapons.

#### OBJECTIVE, SCOPE, AND METHODOLOGY

Our principal objective was to evaluate Tomahawk nuclear armed cruise missile safety/security and measures planned to safeguard the public against a nuclear weapon accident. Based on discussions and agreements with your office, we obtained information on Navy nuclear weapon accidents and incidents, Department of Defense (DOD)/Department of Energy (DOE) nuclear weapon accident response capabilities, and nuclear weapon accident hazards and exercises.

Our review was done at DOD, DOE, Federal Emergency Management Agency (FEMA), and Navy headquarters in Washington, D.C. We also visited Offices of the Commander in Chief, Atlantic Fleet, and the Commander, Naval Base Norfolk, in Norfolk, Virginia, and the Federal Emergency Management Agency Region II office in New York City, New York.

Our work focused on Tomahawk nuclear armed cruise missile safeguards. We interviewed agency representatives and obtained information on nuclear warhead safety/security, including Tomahawk Land Attack Missile-Nuclear system safety studies and analyses, and on nuclear weapon accidents, hazards, exercises, and responsibilities.

We also obtained Navy instructions on environmental and natural resource protection and discussed pertinent provisions of these with Navy representatives, as they relate to the Stapleton-Fort Wadsworth site. We did not evaluate the need for homeporting a Surface Action Group at Staten Island. We examined the status and progress of site-specific emergency

preparedness and security planning as of April 1985, in light of Navy instructions to coordinate and direct emergency responses on the part of federal, state, and local governments.

### ENVIRONMENTAL IMPACT STATEMENT

The National Environmental Policy Act of 1969 (NEPA) requires all federal agencies, "to the fullest extent possible," to prepare an environmental impact statement (EIS) to accompany proposals for major federal actions significantly affecting the environment. The act also requires this statement to be made available to the public, subject to the provisions of the Freedom of Information Act. The Freedom of Information Act exempts from disclosure classified material dealing with national security, such as information relating to the presence of nuclear weapons.

Navy instructions require that environmental considerations be built into the mainstream of the decisionmaking process from the inception of new projects. Navy officials assured us that it is the department's policy to comply fully with NEPA.

Navy instructions also call for the development of an EIS for classified projects or portions of projects. When feasible, Navy officials are instructed to organize the draft EIS so that the unclassified portions can be made available to the public and the classified portions are included as annexes. If nuclear weapons are proposed to be present while ships are in or near port, NEPA and Navy instructions contemplate that such classified EIS documents would be prepared for use in the decisionmaking process concerning the homeporting action. Weinberger v. Catholic Action of Hawaii. 454 U.S. 139 (1981).

The Surface Action Group will be nuclear weapons capable. According to the decision in the Weinberger case, it is a proposal to place nuclear weapons on the ships that triggers the EIS requirement, not the mere possibility. The existence of a proposal, and thus the existence of an EIS addressing the environmental impacts of nuclear weapons presence or storage, may be properly classified information. As such, according to Weinberger, the classified EIS or annex would be beyond both public and judicial scrutiny. Even if such a document cannot be examined in a public forum, it must still be prepared and its contents evaluated by the Navy official making the homeport decision.

In its draft EIS released for public comment, October 19, 1984, the Navy interpreted the Weinberger decision as excusing it from discussing any issues relating to nuclear weapons. Our

understanding of Weinberger is that an EIS must be prepared for internal use if nuclear weapons are proposed to be present, but that its existence and contents need not be disclosed. The majority opinion, made this clear saying:

"If the Navy proposes to store nuclear weapons at [a Hawaii munitions storage facility, the Navy's] regulations can fairly be read to require that an EIS be prepared solely for internal purposes, even though such a document cannot be disclosed to the public. The Navy must consider environmental consequences in its decisionmaking process, even if it is unable to meet NEPA's public disclosure goals... ."

Public hearings on the draft EIS were held in December 1984. The Navy filed the final EIS with the Environmental Protection Agency in February 1985.

We found, and DOD concurred, that public health and environmental safety concerns have developed based on the assumption that nuclear weapons will be aboard ships at Stapleton-Fort Wadsworth. The Navy's unclassified draft EIS did not include information on nuclear weapon accident effects. Many written comments received by the Navy on the draft EIS concerned nuclear weapon accidents. Our examination of these comments indicated that the public is not well informed about nuclear weapon safety, accident hazards, and environmental effects.

The Navy's final EIS addressed the homeporting operational effects on a range of environmental and socioeconomic issues, including navigation safety and public concern with ship accidents and mishaps at the New York harbor. The Navy appended to its final EIS, references to nuclear topics that are available to the public independent of the EIS. The references to nuclear topics were provided to answer public concerns received by the Navy in response to the draft EIS.

According to DOD, the Navy was under no legal requirements to append any information regarding nuclear topics to the final EIS. However, in comments to the Navy on the final EIS and the appended information, several congressional sources concluded that the Navy's references to public documents and correspondence as the mechanism for addressing nuclear weapon accident concerns of the public is inadequate.

It appears that information identified through the EIS process has not alleviated public fears about nuclear weapon safety and accident effects. The Navy is aware that similar concerns are being expressed about sites where the proposed West Coast and Gulf Coast SAGs may be homeported.

NUCLEAR WEAPON SYSTEMS SAFETY--  
TOMAHAWK LAND ATTACK MISSILE

It is DOD policy that nuclear weapon systems require special consideration because of their political and military importance, their destructive power, and the potential consequences of an accident or unauthorized act. DOD and the Navy require that nuclear weapon systems be protected against the risks and threats inherent in their environment.

A nuclear weapon system consists of a delivery vehicle, a nuclear warhead, and those components (facilities, support equipment, procedures, and personnel) required for its operation. The surface launched Tomahawk Land Attack Missile-Nuclear (TLAM-N) weapon system on board a ship includes a BGM-109A-1 cruise missile with a W80-0 nuclear warhead, deck mounted armored box launchers, a weapon control system, and a mission planning system.

DOD's goal in nuclear weapon system safety is to assure that systems are designed, maintained, transported, stored, and employed so as to incorporate maximum safety consistent with operating requirements. System safety is achieved through compliance with the following four DOD nuclear weapon system safety standards.

- There shall be positive measures to prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons, from producing a nuclear yield.
- There shall be positive measures to prevent deliberate prearming, arming, launching, firing, or releasing of nuclear weapons except upon execution of emergency war orders or when directed by competent authority.
- There shall be positive measures to prevent inadvertent prearming, arming, launching, firing, or releasing of nuclear weapons in all normal and credible abnormal environments.
- There shall be positive measures to ensure adequate security of nuclear weapons.

A positive measure is a design feature, safety device, or procedure that exists solely or principally to provide nuclear system safety.

Examples of TLAM-N system safety features and procedural safeguards, which will help to ensure compliance with each of the four DOD safety standards, are:

- To prevent a nuclear weapon in an accident from producing a nuclear yield, strong-link safety devices and weak-link components are installed to work together to achieve nuclear detonation safety. The strong-link safety devices make the warhead incapable of a nuclear explosion by maintaining their integrity in an accident environment until key weak-link components fail and provide permanent protection.
- To prevent unauthorized launching of a missile, a coded order conveying nuclear release authority must be received and authenticated by a two-man control team and verified by the commanding officer.
- To prevent an inadvertent launch of a missile, critical electrical cables from the armored box launcher are not connected to the missile until launch procedures are initiated.
- To help ensure adequate shipboard security, TLAM-N is protected by an intrusion detection alarm system that indicates an intrusion, both visually and audibly, at a continuously manned station capable of dispatching a security team.

The search for nuclear weapon system safety is a continuous process, beginning early in development and continuing throughout the life cycle of the system. The TLAM-N system initial safety study, completed in 1982, evaluated the proposed operational concept and design safety features. The preoperational safety study for the surface launched TLAM-N, completed by the Navy in 1984, included preparation of system safety rules and a determination that the system met the four DOD safety standards.

These safety study reports and other classified documents showed the TLAM-N W80-0 nuclear warhead to be one of the safest, most modern designs in the nuclear weapon inventory. Further, TLAM-N safety features and procedural safeguards, intended to bring the system into compliance with DOD safety standards, if implemented properly, should reduce the danger of a nuclear weapon accident to a minimum.

#### NUCLEAR WEAPON ACCIDENTS AND INCIDENTS

A nuclear weapon accident is an unexpected event involving nuclear weapons or radiological nuclear weapon components that results in:

- Accidental or unauthorized launching, firing, or use by U.S. forces or U.S. supported allied forces of a nuclear capable weapons system that could create the risk of an outbreak of war.
- Nuclear detonation.
- Nonnuclear detonation or burning of a nuclear or radiological nuclear weapon component.
- Radioactive contamination.
- Seizure, theft, loss, or destruction of a nuclear weapon or a radiological nuclear weapon component, including jettisoning.
- A public hazard, actual or implied.

Our review of DOD documents showed that despite severe stresses imposed on nuclear weapons involved in accidents, there never has been an inadvertent U.S. nuclear detonation. The United States, however, experienced nuclear weapon accidents during the period 1950-68 that resulted in detonation of the high explosive components of the weapon and in radiological problems. Most of the weapon systems involved in these accidents are no longer in the active inventory.

Nuclear weapon accidents involving severe damage to weapons occurred during U.S. Air Force operations. Two accidents, resulting in radiological problems, occurred during airborne alert flights by the Strategic Air Command. Airborne alert flights were terminated in 1968.

Since 1968 only one accident involving a nuclear weapon system has occurred. In this Air Force accident, the nuclear warhead was exposed to violent explosion and very severe impact with the ground. Despite these abnormal conditions, the weapon remained intact and there was no dispersal of nuclear materials or radioactive contamination.

Navy ships have operated with nuclear weapons capability for nearly 30 years. Our review of DOD records showed that the Navy has had three nuclear weapon accidents. None of these accidents resulted in severe damage to the weapon or release of radioactive material. Further, these accidents did not occur on ships in port or where civilian population or property was endangered.

A nuclear weapon incident is an unexpected event involving nuclear weapons, test and training weapons, bomb dummy units, nuclear weapon facilities, components, or associated test and

handling equipment that does not fall in the nuclear weapon accident categories. The Navy reported 563 nuclear weapon incidents from January 1965 through December 1983. Of the 563 nuclear weapon incidents reported, 330 involved no weapon or the weapon or component involved was nonnuclear.

The Navy reported 233 incidents involving nuclear weapons from 1965 through 1983. Most of these incidents occurred at sea and at Navy shore facilities. Sixty-two incidents involved nuclear weapons aboard surface ships in port. Because nuclear components were not damaged, none of these incidents posed a threat to the public. Many of the incidents in port were caused by sprinkler malfunctions, which resulted in flooding of the weapons magazine. None of the nuclear weapon incidents were caused by ship collisions.

#### NUCLEAR WEAPON ACCIDENT HAZARDS

The Department of Energy designs nuclear weapons to ensure weapon integrity even in the event of an accident. Nuclear detonation requires a specific sequence of positive actions. While it is not feasible to predict the exact effect of an accident, DOE studies indicate that the possibility of an accidental nuclear explosion while transporting or storing nuclear weapons is so remote as to be virtually nonexistent.

Nuclear weapons are constructed to prevent a nuclear yield in an accident situation. DOE/DOD documents indicate, however, that in nuclear weapon accident situations there is a probable hazard commensurate with that of conventional weapons and materials. The two components of a nuclear weapon that constitute the most probable hazard in an accident are the (1) high explosives and (2) plutonium. Other components may produce hazards, but, according to DOE/DOD, they are of such a nature that precautions taken against explosives and plutonium are more than sufficient for control of the other hazards.

#### High explosives

Nuclear weapons contain conventional high explosives in varying amounts, depending upon the weapon. These high explosives comprise the major hazard associated with accidents involving nuclear weapons.

The high explosive used in the TLAM-N W80-0 nuclear warhead is a new type, called "insensitive" high explosive. This explosive is designed to be resistant to detonation from energy sources other than the source intended to fire the weapon.

In a nuclear weapon accident involving high explosives, there is some possibility of a detonation of the explosive-- either a single explosion or several small explosions. The breakup of a nuclear weapon due to impact or a small explosion could result in the local scattering of small pieces of high explosive. In this condition, explosives are more unstable and may detonate.

If a nuclear weapon is involved in the flame of a fuel fire, the high explosive may ignite, burn, and detonate. In a fire, the high explosive may also melt, flow out of the weapon, and resolidify. In this state, the explosive may be sensitive to shock and detonate. When unconfined outside the weapon, high explosives may also burn, producing toxic gases and leaving a toxic residue.

The ignition or detonation of the high explosive in a nuclear weapon involved in a fire can be prevented if the explosive's temperature is kept below certain degrees. To protect the TLAM-N and the W80-0 nuclear warhead, the armored box launcher includes fire suppression systems that automatically activate at temperatures considerably below the high explosive ignition or detonation temperature.

### Plutonium

Plutonium is a highly toxic, radioactive material. However, if plutonium remains outside the human body it is not a hazard, according to DOE and DOD documents. Plutonium emits alpha radiation. Alpha particles lack the ability to penetrate the skin, which makes it markedly different from radioactive fallout from a nuclear explosion.

Plutonium may be hazardous if dispersed as small particles upon weapon impact, upon detonation of high explosives, or if dispersed as fumes if a fire occurs. When plutonium particles are suspended in the air, it is possible to inhale them into the lungs or to swallow them. Cuts in the skin provide another source of plutonium entry into the body through the blood stream.

DOE/DOD analyses indicate that inhalation of fine plutonium particles during passage of the cloud resulting from a detonation of the high explosive or a fire is the main potential source of plutonium intake into the body. DOE documents show that the plutonium hazard has been reduced in recent years because modern nuclear weapons, such as the Tomahawk, are designed to prevent the release of plutonium by accidental impact, nonnuclear explosion or fire. In the event of an accidental fire involving the high explosive, nuclear weapon

experiments conducted by DOE under extreme conditions indicated that less than one percent of the radioactive material would be aerosolized. Of this aerosolized portion, only a small fraction would be in a size range that is respirable.

According to DOE documents, in the worst case where a modern nuclear warhead, such as the Tomahawk, would be exposed to the intense heat of a petroleum fed fire, the release of plutonium to the atmosphere outside the ship area would be negligible. Further, in actual accidents involving the burning of plutonium-bearing weapons, the non-aerosolized plutonium contamination that occurred was limited to an area less than 100 square feet or to water drains in the area.

#### NUCLEAR WEAPON ACCIDENT RESPONSIBILITIES AND ROLES

In the event of a nuclear weapon accident, Navy and federal objectives are to render the weapon(s) safe from nuclear and conventional explosion, recover all classified materials, and assist in restoring the affected area to normal use. DOD, DOE, and the Federal Emergency Management Agency are the primary federal agencies responsible for responding to a nuclear weapon accident and assisting affected states and local communities.

#### DOD

DOD is charged with the safe handling, storage, maintenance, assembly, and transportation of nuclear weapons in its custody. Inherent in this responsibility is the requirement to protect life and property from any health or safety hazards that could ensue from a nuclear weapon accident. To fulfill these responsibilities, DOD has issued plans and policy guidance requiring the development of a well-trained and equipped nuclear accident response organization.

DOD policy guidance assigns responsibility for "on-site" command and control to the service in charge of the facility or the ship where the accident occurs. If an accident occurs beyond the boundaries of a DOD installation, primary command responsibility for control at the scene rests with the service having physical possession of the weapon at that time. Command at the accident scene is assumed as soon as possible by a designated representative--the On-Scene Commander--of the service that has primary command responsibility.

If an accident occurs outside the boundaries of a DOD facility, according to DOD, the land may be temporarily placed under federal control by the establishment of a National Defense

Area to protect U.S. government classified materials. The land reverts to state or local control upon disestablishment of the National Defense Area.

### U.S. Navy

The Commander in Chief, Atlantic Fleet, and the Commander in Chief, Pacific Fleet, exercise primary command authority over nuclear weapon accidents occurring at Navy installations within their territorial jurisdictions. The Fleet commanders designate accident coordinators who prepare Disaster Control Recovery Plans. These plans (1) identify all forces capable of responding to a nuclear weapon accident, (2) outline procedural steps for responding to and containing an accident, and (3) discuss the level of coordination desired with state and local governments.

### State and local governments

"Off-site" authority and responsibility at a nuclear weapon accident rest with state and local officials. The state governor is responsible for the health, safety, and welfare of individuals within the territorial limits of the state during emergencies. If a nuclear weapon accident occurs, the governor is expected to direct measures to satisfy that responsibility. The On-Scene Commander, in coordination with FEMA, will assist the state to ensure the public is protected.

### FEMA

In the event of a nuclear weapon accident, FEMA's primary role is to coordinate state and local requests for assistance from federal agencies and to assure that off-site actions and response activities of federal, state, and local officials are mutually supportive and coordinated with on-site actions. This role is carried out through a senior FEMA official.

A senior FEMA official is sent to the scene if an accident has an effect outside a DOD installation boundary or ship. This official is to establish a Federal Response Center near the accident scene but outside the National Defense Area. Not only will this center have a representative from each federal agency at the scene but it may have representatives from state emergency services organizations and volunteer agencies.

From the center, the senior FEMA official is to make recommendations to state and local officials regarding protective actions. The senior FEMA official relies upon the technical expertise of DOD and DOE in making these recommendations.

DOE

DOE is responsible for dispatching its response elements to the scene of a DOD nuclear weapon accident. The specific response elements, including any specialized personnel and equipment, are chosen to best meet the accident situation.

DOE has established as its primary nuclear weapon accident response element an Accident Response Group comprised of scientists and technical specialists who are equipped for short notice dispatch to the scene. This group is to advise and assist the service On-Scene Commander in weapon recovery operations and in evaluating, collecting, handling, and mitigating radioactive and other nuclear weapon associated hazards. DOE also has off-site technical responsibility; for example, it conducts off-site radiological monitoring and assessment activities in accordance with the Federal Radiological Emergency Response Plan published in the Federal Register by FEMA on September 12, 1984.

NUCLEAR WEAPON ACCIDENT EXERCISES

National nuclear weapon accident response capability exercises, which included representative weapons then in existence, were conducted in 1979, 1981, and again in 1983. The 1981 and 1983 exercises were joint DOD, DOE, and FEMA exercises that involved state emergency response organizations. They were intended to simulate local government and civilian activities in an accident environment.

The Navy played the primary response role in the 1983 exercise. This exercise, conducted at DOE's Nevada Test Site, combined the maximized effects of an on-base nuclear weapon accident with severe off-base consequences. A live radioactive contaminant was used for realism.

According to DOD, the 1983 exercise was a learning experience of great benefit to the nuclear weapon accident response community. Comparison of the 1983 exercise deficiencies and lessons learned with those of earlier exercises illustrated major improvements and understanding of the problems inherent in a nuclear weapon accident.



RESEARCH AND  
ENGINEERING

## THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301-3010

15 APR 1985

Mr. Frank C. Conahan  
Director, National Security and  
International Affairs Division  
US General Accounting Office  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report No. 394037, "Observations on Navy Nuclear Weapon Safeguards and Nuclear Weapon Accident Emergency Planning," dated February 8, 1985 (GAO Code No. 394037/OSD Case No. 6694).

DoD generally concurs with the draft report. Specific comments which address the report findings are attached.

Sincerely,

  
JAMES P. WADE, JR.  
Acting

Attachment

GAO note: Page references in this appendix and in appendix III have been changed to correspond to pages in the final report.

GAO Draft Report No. 394037  
(OSD Case No. 6694)

on  
Observations on Navy Nuclear Weapons  
Safeguards and Nuclear Weapon Accident  
Emergency Planning

February 8, 1985

FINDINGS

FINDING A: The Secretary of the Navy Announced on July 29, 1983, Selection of the Stapleton-Forth Wadsworth Site on Staten Island As The "Preferred Homeport" Alternative For a Surface Action Group. GAO found that the Navy selected the Staten Island site following a technical analysis of proposals requested and received from three possible northeastern U.S. locations. GAO noted that a final northeastern homeport decision is expected to be announced in April 1985. GAO further found that the Navy plans to request about \$115 million of fiscal year 1986 and 1987 military construction funding to construct facilities at the northeast homeport site, and that if these requests are funded, the homeport should be operational by late 1988. [See p. 2 of letter and p. 1 of app. I.]

DoD Position: DoD concurs. The information should be updated to reflect that the Navy requested about \$165 million rather than \$115 million in military construction funding in fiscal years 1986 and 1987. In addition, the Navy northeastern homeport decision is now expected in March rather than April 1985.

FINDING B: The Navy Has Announced That the Surface Action Group will be Nuclear Weapons Capable, Creating Public Health and Environmental Safety Concerns in the New York City Area. GAO reported that Navy regulations require that both unclassified and classified actions associated with the development of the preferred homeport site be addressed by an environmental impact statement. GAO found that a draft, unclassified environmental statement released for public comment by the Navy on October 19, 1984, did not include information on nuclear weapon accidents and that many written comments received concerned nuclear weapon accidents. However, GAO also found that Navy officials are instructed to organize the draft environmental impact statement so that the unclassified portions can be made available to the public and classified portions included as annexes. GAO noted that the law and Navy instructions contemplate that such classified documents would be prepared for use in the homeporting action decision process. GAO found that the Navy expects to finalize the environmental impact statement in April 1985, and

shortly thereafter announce the site of the northeastern homeport. [See p. 3 of letter and pp. 3-4 of app. I.]

DoD Position: DoD Concurr. The information should be updated to reflect the fact that the final environmental impact statement was filed on February 1, 1985, and that the Navy northeastern homeport decision is expected in March 1985.

FINDING C: Department of Defense and Navy Guidance Require That Nuclear Weapon Systems Be Protected Against The Risks And Threats Inherent In Their Environment. GAO found that an initial safety study of the Tomahawk, Land Attack Missile-Nuclear weapons system completed in 1982, evaluated the proposed operational concept and design safety features. In addition, GAO found that the Navy's preoperational safety study of Tomahawk in 1984 included preparation of system safety rules and a determination that the system met Department of Defense and Navy safety standards. GAO reported that these safety study reports and other classified documents showed the Tomahawk nuclear warhead to be one of the safest, most modern designs in the nuclear weapon inventory. GAO concluded that safety features and procedural safeguards intended to bring the Tomahawk system into compliance with DoD safety standards, if implemented properly, should reduce the danger of a nuclear weapon accident to a minimum. [See pp. 3-4 of letter and pp. 5-6 of app. I.]

DoD Position: DoD concurs.

FINDING D: Despite Severe Stresses Imposed On Nuclear Weapons Involved In Accidents, There Has Never Been An Inadvertent U.S. Nuclear Detonation. GAO found that during the period 1950-1968 nuclear weapon accidents occurred which resulted in detonation of the high explosive components of the weapon and created radiological problems, however, most of these systems are no longer in the active inventory. Since 1968, GAO found only one accident involving a nuclear weapon system has occurred. However, GAO found that despite the nuclear warhead being exposed to an extremely violent explosion and very severe impact with the ground, the weapon remained intact and there was no dispersal of nuclear materials or radioactive contamination. GAO further found that Navy ships have operated with nuclear weapons capability for nearly 30 years, and three nuclear accidents have occurred. However, GAO reported that none of these accidents resulted in severe damage to the weapon or release of radioactive material, and none occurred on ships in port or where the civilian population or property was endangered. [See pp. 4-5 of letter and p. 7 of app. I.]

DoD Position: DoD concurs.

FINDING E: Department of Energy and Department of Defense Studies Indicate that the Possibility of an Accidental Nuclear Explosion While Transporting Or Storing Nuclear Weapons Is So Remote As To Be Virtually Non-Existent. GAO found that in nuclear weapon accident situations such as fires, there is a probable hazard commensurate with conventional weapons and materials, primarily involving high explosives and plutonium. GAO reported that according to a Department of Energy and Defense document, high explosives comprise the major hazard. GAO found, however, that the Tomahawk nuclear warhead is designed to resist detonation from energy sources other than the source intended to fire the weapon. GAO also reported that Department of Energy documents show the plutonium hazard has been reduced in recent years because modern nuclear warheads such as the Tomahawk are designed to prevent the release of plutonium under accident conditions. [See pp. 5-6 of letter and pp. 8-10 of app. I.]

DoD Position: DoD concurs.

FINDING F: National Nuclear Weapon Accident Response Capability Exercises Were Conducted In 1979, 1981, and 1983. GAO reported that the 1983 exercise was a learning experience of great benefit to the nuclear weapon accident response community. GAO concluded that a comparison of the 1983 exercise deficiencies and lessons learned with those of earlier exercises illustrated major improvements and understanding of the problems inherent in a nuclear weapon accident. [See p. 6 of letter and p. 12 of app. I.]

DoD Position: DoD concurs.

#### RECOMMENDATIONS

There were no recommendations included in the report.

~~CONFIDENTIAL~~

APPENDIX III

APPENDIX III



RESEARCH AND  
ENGINEERING

THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301-3010

2 JUL 1985

Mr. Frank C. Conahan.  
Director, National Security and  
International Affairs Division  
US General Accounting Office  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the request for a security review of the General Accounting Office (GAO) draft report No. 394037, "Observations on Navy Nuclear Weapons Safeguards and Nuclear Weapons Accident Emergency Planning," dated May 1985 (GAO Code No. 394037/OSD Case No. 6694).

The DoD concurs with the GAO objective of an unclassified report. Subject to making the recommended changes in Attachment 1, the draft report may be reclassified from SECRET (Restricted Data) to UNCLASSIFIED. If the recommended changes are not incorporated, the proper classification of the report is CONFIDENTIAL (FORMERLY RESTRICTED DATA).

It is noted that significant modifications have been made to the draft report since the DoD submitted, on March 15, 1985, its formal comments on the initial draft dated February 8, 1985. Specific comments regarding those modifications are found in Attachment 2.

Sincerely,

JAMES P. WADE, JR.  
Acting

Attachments

cc:  
DAIG(GAO Rpt Analysis)

UNCLASSIFIED UPON REMOVAL  
OF ATTACHMENT 1

Document Transmitted  
Herewith Contains  
FORMERLY RESTRICTED DATA

~~CONFIDENTIAL~~

GAO note: An attachment to this letter has been deleted in order to maintain an UNCLASSIFIED report.

GAO Draft Report No. 394037  
(OSD Case No. 6694)

on  
Observations on Navy Nuclear Weapons Safeguards  
and Nuclear Weapons Accident Emergency Planning

May 1985

**MODIFICATION COMMENTS**

**Modification A:** Several Congressional sources have concluded that action taken by the Navy to append referenced material regarding nuclear topics to its final EIS is inadequate and disappointing. [See p. 4, app. I.]

**DoD Comment:** DoD does not dispute the fact that GAO was able to find several Congressional sources who expressed displeasure with the Navy's final EIS. It should be noted, however, that the Navy was under no legal requirements to append any information regarding nuclear topics in their final EIS. The information provided by the Navy was an attempt to provide background reference material to answer the public concerns regarding nuclear topics that were received by the Navy as a result of the draft EIS. It is felt that, if pressed, GAO could find "some Congressional sources" which were pleased that the Navy, in an attempt to answer known public concerns, appended reference material regarding nuclear topics to its final EIS.

**Modification B:** Due to fears about nuclear weapon safety and nuclear weapon accident effects, the public is concerned about homeporting nuclear capable SAGs in West Coast and Gulf Coast cities. [See p. 4, app. I.]

**DoD Comment:** Certainly some percentage of the public, especially those associated with the anti-nuclear movement, have expressed their concern about homeporting nuclear capable SAGs in other cities besides New York City (NYC). DoD notes,

however, that the Navy is only considering homeporting SAGs in locations to which they have been formally invited. It is felt that GAO, in fairness, could make note of the fact that the Navy received correspondence from a large number of people in NYC as well as other potential SAG homeport sites (West and Gulf Coasts) who desire the Navy to homeport ships in their cities and who are not concerned about whether or not those ships are nuclear capable.

**Modification C:** GAO has added the definition of a nuclear weapon accident to their draft report. [See p. 4 of letter.]

**DoD Comment:** It is felt that adding the definition of what constitutes a nuclear weapon accident improves the report. In a similar manner, it is felt that the full definition of what constitutes a nuclear weapon incident should also be included in the report. To that end, it is recommended that the following change be made to the second paragraph on page 5 in the letter to Congressman Weiss and paragraph five on page 7 of Appendix I to the draft report: "A nuclear weapon incident is an unexpected event involving a nuclear weapon/component (including war reserve, test and training weapons or bomb dummy units) or associated test and handling equipment which does not fall into the category of a nuclear weapon accident."

**Modification D:** The Navy reported 563 nuclear weapon incidents for the period January 1965 through December 1983. [See p. 5 of letter and p. 8 of app. I.]

**DoD Comment:** Although a total of 563 nuclear weapon incidents are reported, the GAO draft report only accounts for 399 (334

involved no weapon, 65 involved nuclear weapons aboard ships in port). It is recommended that GAO fully account for the total (563) or change the words to reflect that the Navy reported 229 nuclear weapon incidents involving nuclear weapons from January 1965 to December 1983 of which 65 involved nuclear weapons aboard ships in port. [See GAO note below.]

GAO note: Numbers of nuclear weapon incidents in the final report were adjusted based on discussions with Navy representatives.

(394037)